

United States
Environmental Protection Agency
Office of Transportation and Air Quality
National Vehicle and Fuel Emissions Laboratory
2565 Plymouth Road
Ann Arbor, MI 48105

Vehicle Fuel Exchange Procedure

This procedure is written for the Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory (NVFEL) internal use. The use of specific brand names by NVFEL in this procedure is for reference only and is not an endorsement of those products. This document may be used for guidance by other laboratories.

NVFEL Reference Number

702 L

Implementation Approval

Original Procedure Authorized by EPCN #095 on 04-30-1990

Revision Description

06-03-1997	The purpose of this change is to revise the procedure as described in EPCN #163.
02-18-2000	The purpose of this change is to revise the procedure as described in EPCN #271.
02-02-2006	The purpose of this change is to revise the procedure as described in EPCN #425. Removed references to fuel cart, removed references to 1978 CFR requirements, added Section 500 diesel fuel exchange process, replaced "Indolene" with "Tier 2" fuel and added California Phase II fuel, updated Vehicle Fuel Exchange form and added EPA Test Request form and Test Parameters/ Data form, updated Attachment B "Fuel Spill Cleanup" instructions. Revised format and made grammatical changes as needed.

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1. Purpose and Overview:

The purpose of this procedure is to prepare gasoline, diesel or methanol-fueled vehicles for preconditioning (PREP) or emission testing by draining all the fuel from the tank(s) and refueling with the required Environmental Protection Agency (EPA) test fuel.

2. Applicability:

This procedure applies to vehicles which are being preconditioned in accordance with NVFEL 703 "Vehicle Preconditioning Procedure" and vehicles which are being prepared for an exhaust emission test.

3. References:

- 3.1 "Code of Federal Regulations" (CFR), Title 40, Part 86, Subparts A and B
- 3.2 NVFEL 703 "Vehicle Preconditioning Procedure"
- 3.3 NVFEL Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A)
- 3.4 NVFEL Form 902-01 "Test Status Report"
- 3.5 NVFEL form 700-01 "Test Parameters / Data" (Shown in Attachment C)
- 3.6 EPA NVFEL Testing Service Test Request Report/Vehicle Information form (Shown in Attachment D)
- 3.7 NVFEL current safety procedures and policies

4. Required Equipment:

- 4.1 Fuel drain pumps, located in the fuel bay
- 4.2 Fuel dispensing equipment, including nozzles and instruments for measuring fuel temperature and quantity, grounding device
- 4.3 Vehicle mover (crab)
- 4.4 Safety equipment, such as methanol-resistant gloves and eye protection.

For Methanol fueled vehicles: Methanol fuel drain, located on the methanol fuel dispensing rack. Stainless steel fuel container, approved for methanol fuels, equipped with an on/off valve, fuel container cart, dispensing hose, digital thermometer, and grounding device.

5. Precautions:

Failure to comply with the precautions outlined in this section could result in an explosion, fire, personal injury, or loss of life.

- 5.1 Only trained EPA laboratory personnel may exchange fuel.
- 5.2 All fueling operations are to be performed in the fuel bay in compliance with fuel bay safety precautions as specified by EPA safety policies.
- 5.3 A technician must be present to monitor the fuel bay area during all draining and fueling operations to ensure that all the fuel has drained from the vehicle and, once the draining process is complete, that the drain pump is turned off.
- 5.4 The test vehicle's engine shall not be operated during the fuel exchange
- 5.5 The test vehicle must be properly grounded prior to any fuel exchange. Do not connect the grounding clip to the trunk latch! If the vehicle is equipped with an automatic pull-down latch mechanism, sparking might result, which could ignite any fuel vapor that is present. Do not connect the cable to the wheel assembly.
- 5.6 Only electrical equipment designed for operation in a combustible environment may be used in the fuel bay.
- 5.7 Technicians fueling the vehicle must be familiar with the alarm sounds and safety procedures which accompany the fuel bay fire extinguishing system, the combustible gas alarm, and the carbon monoxide alarm.
- 5.8 Eye protection and rubber gloves must be used to prevent the risk of bodily injury. Failure to follow safety policies may result in disciplinary action.
- 5.9 If a vehicle is operated in the fuel bay for more than a few seconds, the exhaust must be routed through the ventilation equipment.
- 5.10 A test vehicle should never be operated between the time fuel has been drained from the vehicle and the time it is refueled.
- 5.11 Special care must be taken to avoid fuel spills. Should a spill occur, seek assistance as needed and notify the Compliance/Development Testing Group Leader. See Attachment B for details regarding how to deal with a fuel spill.

6. Visual Inspection:

- 6.1 The technician must ensure the following:
 - 6.1.1 The fuel pumps are on and the system is operational.
 - 6.1.2 Fuel is not leaking from any hoses, nozzles or connections.
 - 6.1.3 The ventilation system is on and operational.
 - 6.1.4 The ground straps are available and functional.
 - 6.1.5 The goggles, methanol-resistant gloves, and spill control materials are available before draining/refueling begins.

7. Preparation:

The technician performing the fuel exchange is responsible for assuring that the following steps are performed prior to the fuel exchange:

- 7.1 Verify that the test documentation corresponds to the vehicle.
- 7.2 Complete a new Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A) for each fuel exchange

Place a check mark next to "1st," "2nd," "3rd," or "Test" to indicate fueling sequence for the vehicle.

If not present, indicate or record the following on the form; test number, vehicle ID number, fuel type and fuel container code.
- 7.3 For the Preconditioning and Highway Fuel Economy Test (HFET):
 - 7.3.1 Drive or crab the vehicle into the fuel bay. Lower the driver's windows and turn the engine off, as applicable.
- 7.4 For the FTP:
 - 7.4.1 Ensure that no more than 1 hour has elapsed since the end of the preconditioning drive. Push or crab the vehicle into the fuel bay and place it near the drain hose. If the windows are up and they are power operated, do not turn the key to lower them but notify the Compliance/Development Testing Group Leader. If they are not power windows, you may roll them down.

- 7.5 For preconditioning ensure that the “Tier 2” or “(California) Phase II” fuel temperature as applicable is within the 45-70 °F range prior to dispensing.

For the Federal Test Procedure (FTP), ensure that the “Tier 2” or “(California) Phase II” temperature as applicable is greater than 45 °F and less than 60 °F prior to dispensing.

- 7.6 For preconditioning, the methanol fuel is not maintained at any specific temperature.

For the FTP, the proper quantity of methanol fuel is dispensed into a sealed and approved fuel container and then chilled to a temperature of 45-53 °F in the Chemistry Laboratory refrigerator or fuel storage room.

- 7.7 Connect the ground cable from the fuel draining site to an unpainted, non-insulated metal part attached to the frame of the vehicle. If that point is not available, connect the cable to the exhaust pipe or engine ground strap.

Do not connect the grounding cable to the trunk latch if the vehicle is equipped with an automatic pull-down mechanism. Sparking might result, which could ignite any fuel vapors present.

Do not connect the cable to the wheel assembly!

8. Procedure:

The technician is responsible for assuring that the following steps are completed during the fuel exchange procedure and for completing Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A).

100 Fuel Drain Sequence:

- 101 Ensure that the grounding strap is properly connected and put on the protective eye wear and rubber gloves. Eye wear must be worn during all draining and fueling of the vehicles. Methanol resistant gloves must be worn when dispensing or draining methanol fuel.
- 102 Remove the vehicle fuel cap and place it in a convenient location where it is safe from possible damage.

103 Draining Gasoline Vehicles:

Connect the fuel bay drain pump hose to the vehicle. If necessary, open the vehicle fuel drain valve. In the case of a fuel spill, refer to Attachment B.

If the vehicle has an auxiliary tank, drain it by connecting the fuel drain valve to the drain pump hose or by inserting a drain line through the auxiliary tank filler neck.

Turn the drain pump valve to the “On” position. The “On” position is parallel to the pump line. The valve is located beneath the blue drain pump on the fuel bay wall. On Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A), record the start-of-drain time.

Drain the vehicle fuel tank, taking care to ensure thorough draining. Stop the drain pump when the test vehicle fuel tank is empty by turning the drain valve to the “Off” (perpendicular to the drain line) position. An empty tank is indicated when little or no fuel flows through the drain hose sight gauge. Disconnect the drain hose from the vehicle. On Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A), record the end-of-drain time.

104 Draining Methanol Vehicles:

Connect the drain hose, which has two female-type quick disconnects, to the quick disconnect located on the methanol fuel drain pump and to the vehicle drain quick disconnect. In the case of a fuel spill, refer to Attachment B.

If the vehicle has an auxiliary tank, drain it by connecting the fuel drain valve to the drain pump hose or by inserting a drain line through the auxiliary tank filler neck.

Ensure that the “Open/Close” valve located on top of the methanol drain tank is in the “Open” position before draining the vehicle. The tank is located outside the building directly behind the fuel bay area; it has a white #4 stenciled on it. The valve “Open” position is parallel to the line running to the drain tank.

Turn the methanol air supply valve to the “On” position. The valve is located to the left of the methanol fuel nozzle rack. The “On” position is parallel to the air supply line

Turn the drain valve, located above the methanol fuel drain pump and to the right of the dispensing nozzles, to the “On” (parallel to the drain line) position to begin the fuel drain. On Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A), record the start-of-drain time.

Drain the vehicle fuel tank, taking care to ensure thorough draining. An empty tank is indicated when little or no fuel flows through the drain hose sight gauge. Stop the methanol drain pump by turning the methanol air supply valve to the “Off” (perpendicular to the drain line) position and record the end-of-drain time on Form 702-01 “Vehicle Fuel Exchange”.

105 Draining Diesel Vehicles

The diesel fuel drain pump is located on the rear wall of the East bay.

In the case of a fuel spill, refer to Attachment B.

Connect the fuel bay drain pump hose to the vehicle.

If the vehicle has an auxiliary tank, drain it by connecting the fuel drain valve to the drain pump hose or by inserting a drain line through the auxiliary tank filler neck.

Remove the cap from the tank fill tube.

Turn on the air supply (Shown in Figure 1) located on the west side of the pumping station by turning the valve handle parallel to the supply line.



Figure 1
Air Supply Valve

Then turn on the drain pump (Shown in Figure 2) by turning the valve handle parallel to the supply line.

On Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A), record the start-of-drain time.

Drain the vehicle fuel tank, taking care to ensure thorough draining. An empty tank is indicated when little or no fuel flows through the drain hose sight gauge.

Stop the drain pump when the test vehicle fuel tank is empty.

Turn the air supply valve to the off position.

Disconnect the drain hose from the vehicle and reinstall filler cap.

Record the end-of-drain time on Form 702-01 “Vehicle Fuel Exchange”.



Figure 2
Diesel Dump Drain Valve

200 Fueling Gasoline Vehicles:

The specific type of gasoline “Tier 2” or “Phase II” (California) to be used is specified on NVFEL form 700-01 “Test Parameters / Data” (Shown in Attachment C) and EPA NVFEL TS Test Request Report/Vehicle Information form (Shown in Attachment D).

- 201 Gasoline dispensing stations are located in the fuel bay. The stations are labeled i.e. “Tier 2 Test”, “Tier 2 Prep.” and (California) Phase II Fuel. Each station has its own fuel meter, dispense option lever, and fuel temperature gauge. The dispense option lever and temperature gauge are located on the side of the station. The dispense lever allows you to select either “Circulate” or “Dispense,” and the gauge indicates the temperature of the fuel in the system

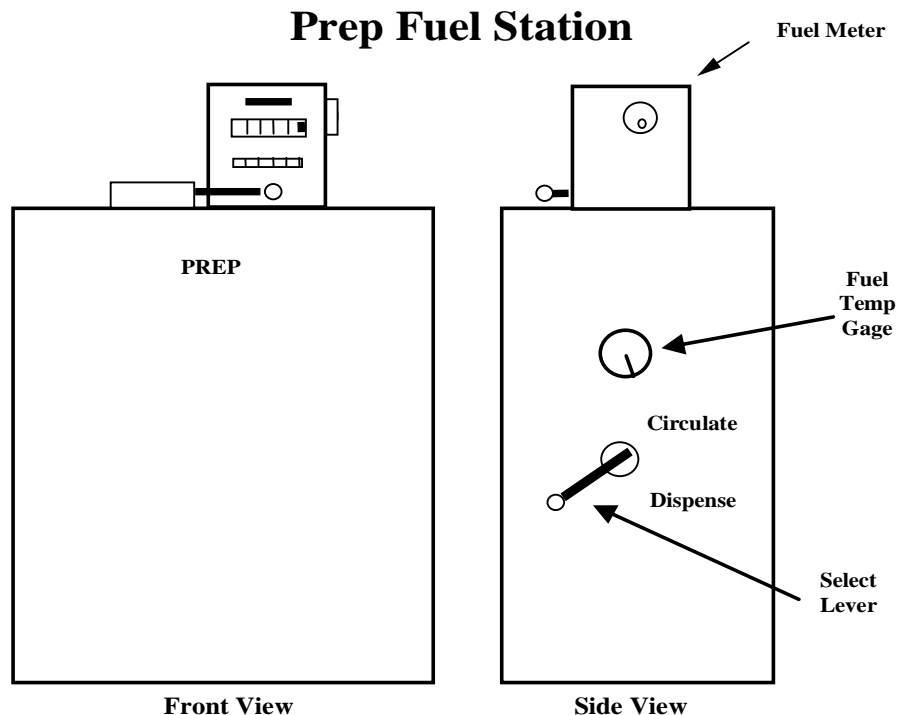


Figure 3
Typical Gasoline Dispensing Station

- 202 Reset the dispense meter (Shown in Figure 3) to zero by turning the crank on the right side of the fuel meter one complete revolution.

If the meter does not read zero, rotate the crank again.

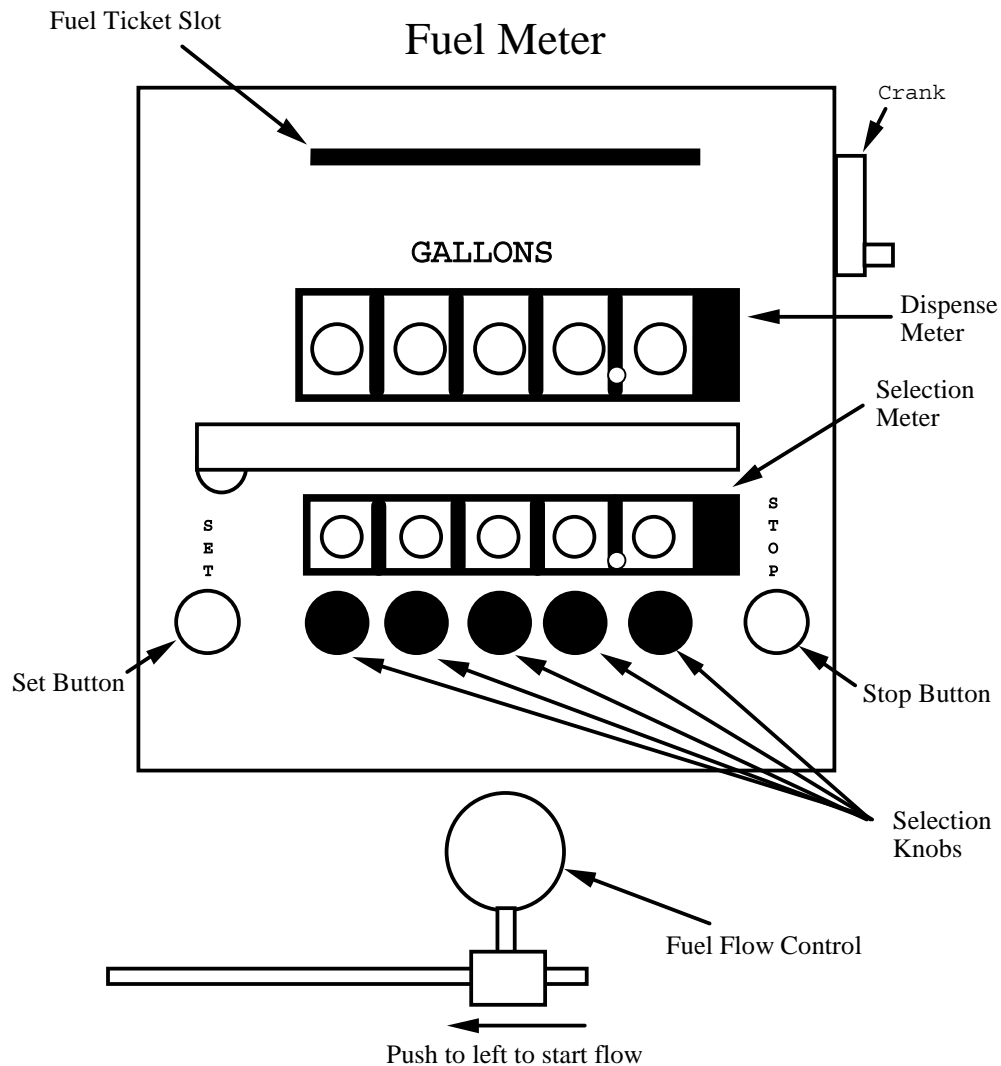


Figure 4
Gasoline Fuel Meter

- 203 Push the “Set” button until a click is heard. This will allow the use of the black “Selection” buttons to dial in the number of gallons you wish to circulate or dispense.

The black buttons, from right to left, incrementally represent 0.1 gallon, 1 gallon, 10 gallons, 100 gallons, and 1000 gallons. Each time a button is pushed, the number displayed in the “Selection” meter will increase by a value of 1.

If a value of zero is desired, and a number already exists in the selection meter, push the button as many times as necessary until a zero shows on the meter.

Example: You need to circulate 8.0 gallons of fuel. The dispense meter is reset to zero and the selection meter reads 0010.3 gallons

Push the right button (0.1-gallon increments) seven times, until the number “0” appears in the tenths column of the meter. The meter will now read 0010.0 gallons.

Push the second button (1-gallon increments) eight times, until the number “8” appears in the ones column of the meter. The selection meter will now read 0018.0 gallons.

Finally, push the third button (10-gallon increments) nine times, until the number “0” appears in the tens column of the meter.

The selection meter will now display 0008.0 gallons.

- 204 Use the “Selection” buttons as described above and dial in 0005.0 gallons.
- 205 Ensure that the dispense option lever is in the “Circulate” position.
- 206 Push the fuel flow control lever to the left. The dispense meter will start to move, indicating that fuel is being circulated through the system. When 5.0 gallons of fuel have been circulated, the fuel control lever will return to the right and stop the fuel flow.

- 207 The fuel is maintained to within the ranges specified below. Check the gasoline temperature in the following manner:

For PREP and the HFET use the “Tier 2 Prep” Station or “(California) Phase II” as applicable:

Note: There are no CFR fuel temperature specifications for preconditioning or HFET.

Before dispensing the fuel, verify that the fuel temperature is within the 58-66 °F range. If the prep fuel temperature is out of the 58-66 °F range, notify the Compliance / Development Testing Group Leader.

If the fuel temperature is out of the 58-66 °F range but is in the 45-70 °F range, the prep fuel dispenser may still be used. In the “Comments” section of Form 702-01, note that you notified Compliance / Development Testing Group Leader.

If the “Tier 2 Prep” fuel dispenser temperature is not within the 45-70°F range, check the “Tier 2 Test” dispenser temperature, and if it is within the 45-70 °F range, use the test fuel dispenser to fuel the vehicle.

For the FTP use the “Tier 2 Test” Station or California Phase II as applicable::

Before dispensing the fuel, verify that the fuel temperature is within the 45-60 °F range. If the fuel temperature is not within the 45-60 °F range, notify the Compliance / Development Testing Group Leader

- 208 Remove the nozzle/hose assembly from the fuel station bracket. Insert the fuel nozzle into the tank filler neck of the vehicle to be filled. Pull the nozzle dispense mechanism and set it in position to dispense fuel.
- 209 On Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A), record the dispenser fuel temperature.
- 210 Insert Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A) into the dispenser fuel ticket slot. Place the bottom of the ticket in first, with the text face down.
- 211 Reset the dispense meter to zero by turning the crank one complete revolution.
- 212 On the EPA NVFEL TS Test Request Report/Vehicle Information form (shown in Appendix “D”) find the 40% fuel tank volume. This value is located in the “Nominal Main-Tank Capacity Volume” “40%” field. On rare occasions when equipped, the 40% value for the auxiliary fuel tank is located in the “Nominal Aux-Tank Capacity Volume” “40” field.

Note: The main tank 40% volume data is also available on NVFEL form 700-01 “Test Parameters / Data, shown in Attachment “C”.

- 213 Push the “Set” knob until a click is heard. Use the selection knobs and dial in the required number of gallons to be dispensed.
- 214 Move the dispense option lever to the “Dispense” position.
- 215 Push the fuel flow control lever to the left. The dispense meter will start to move and dispense fuel when you depress the nozzle. The pump will automatically stop when the number of gallons selected has been dispensed.
- If at any time you wish to stop the flow of gasoline to the nozzle, push the “Stop” button located on the right side of the fuel meter.
- 216 If the vehicle has an auxiliary tank, it must also be filled to 40% capacity using the same procedure outlined in Steps 201 through 214.
- 217 Release the nozzle dispense mechanism. Remove the fuel nozzle from the filler neck and place it in the pump station bracket. In the case of a fuel spill, refer to Attachment B.
- 218 For the PREP or HFET:
- Replace the vehicle fuel cap in the filler neck and tighten it according to the manufacturer’s requirements.
- 219 For the FTP:
- Within 1 minute of refueling, replace the vehicle fuel cap in the filler neck and tighten it according to the manufacturer’s requirements. On Form 702-01, record the “Cap On Time.”
- 220 Disconnect the ground strap.
- 221 Return the dispense option lever to the “Circulate” position.
- 222 To release Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A), reset the dispense meter to zero by turning the crank one complete revolution.
- 223 On Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A), record the end-of-fueling time, operator ID, the date, fuel type and fuel container code.
- If the sequence of draining and refueling is delayed for more than 10 minutes, the reason for the delay must be entered in the “Comments” section of Form 702-01 “Vehicle Fuel Exchange” (Shown in Attachment A).

224 Vehicle disposition following refueling:

For the HFET-only:

Within 1 hour of refueling the vehicle shall be driven onto the dynamometer.

For the PREP:

Drive the vehicle to the soak area. The vehicle shall be soaked at 68 - 86 °F for 6 to 36 hours between the end of refueling and the beginning of the preconditioning drive.

For the FTP:

Push or crab the vehicle to the canister preconditioning area.

300 Fueling Methanol Vehicles - PREP and HFET:

Note: There is no CFR specification for prep fuel temperature; therefore, the temperature of the fuel will be that of the current methanol fuel dispensing system. The methanol fuel dispensing system is not temperature controlled.

301 Ensure that Steps 101 through 104 that apply to methanol vehicles have been completed. On the EPA NVFEL TS Test Request Report/Vehicle Information form (shown in Appendix “D”) find the 40% fuel tank volume. This value is located in the “Nominal Main-Tank Capacity Volume” “40%” field. On rare occasions when equipped, the 40% value for the auxiliary fuel tank is located in the “Nominal Aux-Tank Capacity Volume” “40” field.

Note: The main tank 40% volume data is also available on NVFEL form 700-01 “Test Parameters / Data, shown in Attachment “C”.

302 Turn the methanol air supply valve, located underneath the proper fuel nozzle to be used (M50, M85, or M100), to the “Open” position. The “Open” position is when the green handle is pointing up. Make sure the other supply valves are closed (green handle pointing to the right).

303 Depress and hold the “On/Total” button located on the fuel flow system for approximately 3 seconds or until the fuel meter reads zero.

304 Remove the nozzle/hose assembly from the methanol fuel station bracket. Insert the fuel nozzle into the tank filler neck of the vehicle to be fueled. Squeeze the nozzle trigger mechanism and set it in position to dispense fuel.

305 Dispense the required number of gallons (40% volume) into the vehicle. There is no automatic gallon counter on this system; therefore, the dispensing of the fuel must be monitored and stopped manually.

- 306 Release the nozzle trigger mechanism. Remove the fuel nozzle from the filler neck, turn off the air supply valve (the green handle should point to the right) and place the nozzle in the pump station bracket.

If the vehicle is being preconditioned for an FTP, the fuel cap(s) shall be installed according to the manufacturer's requirements within 1 minute of fueling. The vehicle shall be soaked for at least 6 hours after being fueled, then the vehicle may be driven onto the dynamometer.

If the vehicle is being fueled for a HFET, replace the vehicle fuel cap in the filler neck and tighten it according to the manufacturer's requirements. The vehicle may be driven onto the dynamometer.

- 307 On Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A), record the end-of-fueling time, operator ID, and date.

If the sequence of draining and refueling is delayed for more than 10 minutes, the reason for the delay must be entered in the Comments section of Form 702-01.

- 308 Attach the digital thermometer lead to the portable methanol fuel storage tank to read the temperature of the fuel. Be sure the thermometer is set to read the proper thermocouple type.

- 309 On Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A), record the fuel temperature and fuel blend. If draining and fueling a vehicle for the HFET, place a check mark in the "Test" box.

- 310 Place Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A), on the clipboard. Do not complete Steps 311 through 319 if the vehicle is drained and fueled for the HFET, go to Step 319.

- 311 Ensure that the "Open/Close" valve located on the bottom of the portable methanol fuel storage container is in the "Closed" position prior to fueling.

- 312 Obtain enough portable methanol fuel storage containers to hold the volume of fuel required for the FTP. The containers each have a 5-gallon capacity. This step is performed to ensure that chilled fuel (45-53 °F) will be available for the FTP test the next day.

- 313 Fill the container(s) with methanol fuel equal to 40% of the tank volume following Steps 302 through 310.

- 314 Turn off the methanol air supply valve by turning it perpendicular to the air supply line.

- 315 On Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A), record the test number, fuel blend, and vehicle ID number. Place a check mark in the "Test" box. Place the form in the designated slot on the container for the fuel ticket.
- 316 Attach one paper tag to each methanol fuel storage container and label the tag with the date, operator ID, vehicle ID number, fuel blend, and test number.
- 317 Notify Chemistry Lab personnel that you have fuel to be stored and that it will need to be chilled to 45-53 °F.
- 318 Use the designated methanol container cart and transfer the containers to the Vapor Pressure Laboratory.
- 319 Vehicle disposition following methanol refueling:
- For the HFET-only:
- Within 1 hour of refueling the vehicle shall be driven onto the dynamometer.
- For the PREP:
- Drive the vehicle to the soak area. The vehicle shall be soaked at 68 - 86 °F for 6 to 36 hours between the end of refueling and the beginning of the preconditioning drive.

400 Fueling Methanol Vehicles – FTP:

- 401 Drain the vehicle following Steps 101 through 104.
- 402 Using the designated methanol container cart, go to the vapor pressure lab and retrieve the methanol fuel container(s) with the correct fuel for the test vehicle. Return to the fuel bay. The methanol will be transferred from the container to the vehicle using gravity feed.
- 403 Connect the digital thermometer to the storage container's thermocouple outlet. Be sure the thermometer is set to read the proper thermocouple type. Verify that the fuel temperature is between 45 and 53 °F prior to fueling the vehicle.
- 404 Remove Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A) from the container slot and record the fuel temperature.
- 405 Ground and proof the vehicle and fuel container with grounding wires.
- 406 Leave the containers on the cart. Insert the fuel line into the filler neck of the vehicle. Turn the fuel container main fuel "On/Off" valve to the "On" position and use it to regulate the fuel flow into the vehicle.

407 When the container is empty, release the trigger and remove the fuel nozzle from the filler neck and return it to the cart.

408 If the vehicle has an auxiliary tank, it must also be filled to 40% capacity using the same procedure outlined above for filling the main tank to 40% capacity following Steps 401 through 407.

Note: In the case of a fuel spill, refer to the “Fuel Spill Clean-up Instruction” shown in Attachment B.

409 On Form 702-01, record the end-of-fueling time. If the sequence of draining and refueling is delayed for more than 10 minutes, the reason for the delay must be entered in the Comments section of Form 702-01.

410 Place Form 702-01 on the clipboard until it has been validated. Remove the tags from the fuel containers and place them on the clipboard also.

411 Remove the ground cable from the vehicle and the storage container.

412 Use the thermocouple checker to verify the fuel temperature in the tank.

If the fuel temperature in the tank is more than 9 °F different from the dispenser temperature, there may be a problem with the draining of the tank or with the thermocouple. Notify the Compliance / Development Testing Group Leader.

413 For the FTP:

Do not start the vehicle! Push or crab the vehicle to the canister preconditioning area.

500 Fueling Diesel Fuel Vehicles:

501 Diesel dispensing stations are located in the West fuel bay. The stations are labeled to indicate the type of diesel fuel available for dispensing. Each station has its own fuel meter and fuel temperature gauge.

Note: There is no CFR specification for diesel prep fuel temperature; therefore, the temperature of the fuel will be that of the current diesel fuel dispensing system. The diesel fuel dispensing system is not temperature controlled.

502 Unlike the gasoline dispensing stations, there is no re-circulating feature or slot for the Vehicle Fuel Exchange form. The NVFEL 702-01 “Vehicle Fuel Exchange” form shown in Attachment “A” must be manually completed. A new form is completed for each time the fuel is exchanged.

- 503 On NVFEL Form 702-01 “Vehicle Fuel Exchange”, record the following information;
- The fueling number
 - The test number
 - The vehicle ID
 - The dispenser fuel temperature
 - The Fuel Code and Number
 - The fuel type
 - The fuel container code
- 504 Attach a ground strap to the vehicle
- 505 Turn on the power to the applicable pump at the “Starter Rack” electrical panel (shown by Figure 5). The panel is located on the rear wall adjacent to the East fuel bay. Each switch is identified with the type of fuel controlled and has a signal light that will glow when the power to the pump is activated.



Figure 5
Fuel Pump Power Panel

- 506 Reset the applicable dispense meter to zero by turning the knob on the left hand side as shown by Arrow 1 in Figure 6.

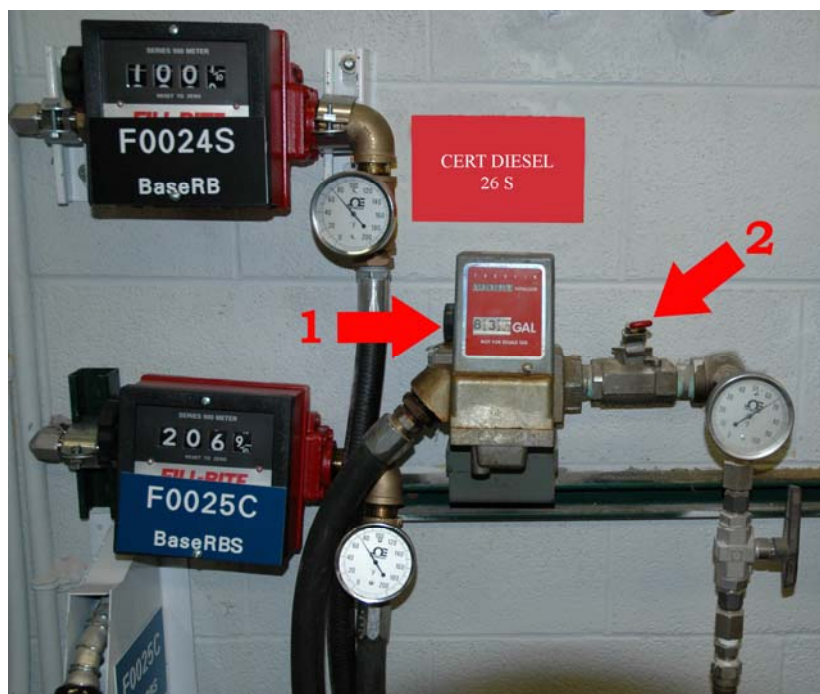


Figure 6
Diesel Fuel Dispensing Meters

- 507 On the EPA NVFEL TS Test Request Report/Vehicle Information form (shown in Appendix “D”) find the 40% fuel tank volume. This value is located in the “Nominal Main-Tank Capacity Volume” “40%” field. On rare occasions when equipped, the 40% value for the auxiliary fuel tank is located in the “Nominal Aux-Tank Capacity Volume” “40” field.
Note: The main tank 40% volume data is also available on NVFEL form 700-01 “Test Parameters / Data, shown in Attachment “C”.
- 508 If the vehicle has an auxiliary tank, it must also be filled to 40% capacity.
- 509 With the cap(s) from the fuel tank(s), fill tube removed, insert the dispensing nozzle into the fill tube
- 510 Dispense the specified amount of fuel while monitoring the dispensing meter. The flow must be stopped manually; there is no automatic stop on these meters. Return the fuel dispensing nozzle to its storage location and turn the fuel flow valve shown by Arrow 2 in Figure 3 to the off position when finished.

Note: In the case of a fuel spill, refer to Attachment B for instructions.

511 For the PREP or HFET:

Replace the vehicle fuel cap in the filler neck and tighten it according to the manufacturer's requirements.

512 For the FTP:

Within 1 minute of refueling, replace the vehicle fuel cap in the filler neck and tighten it according to the manufacturer's requirements. On Form 702-01, record the "Cap On Time."

513 Turn off the power to the pump at the "Starter Station"

514 Disconnect the ground strap.

515 On Form 702-01 "Vehicle Fuel Exchange" (Shown in Attachment A), record the end-of-fueling time, your operator ID, and the date.

If the sequence of draining and refueling is delayed for more than 10 minutes, the reason for the delay must be entered in the "Comments" section of Form 702-01.

516 Vehicle disposition following refueling:

For the HFET-only:

Within 1 hour of refueling the vehicle shall be driven onto the dynamometer.

For the PREP:

Drive the vehicle to the soak area. The vehicle shall be soaked at 68 - 86 °F for 6 to 36 hours between the end of refueling and the beginning of the preconditioning drive.

For the FTP:

Push or crab the vehicle to the canister preconditioning area.

9. Data Input:

9.1 Form 702-01 is completed by the technician who performs the draining and fueling of the test vehicle.

9.2 Paper tags for the fuel containers are completed by the technician who fills the container. The test number, ID number, fuel blend, and date must appear on each tag

10. Data Analysis:

- 10.1 All forms and test records are to be verified by a qualified technician who did not record the data.
- 10.2 The verifying technician checks the data for completeness, correctness, and compliance with EPA regulations. They will write their identification number and the date in the “Verified By” area of the forms. This certifies that the data are correct and complete.

11. Data Output and Records:

- 11.1 The person performing the fuel exchange is responsible for completing an NVFEL form 702-01 “Vehicle Fuel Exchange” for each fuel exchange
- 11.2 The “Vehicle Fuel Exchange” Form 702-01 remains with the test data packet and is delivered to the Data Processor upon completion of the FTP or Highway Fuel Economy Test.
- 11.3 For methanol-fueled vehicles, paper tags remain with the data packet and are delivered to the Data Processor upon completion of the FTP or Highway Fuel Economy Test.

12. Acceptance Criteria:

- 12.1 The required fuel type must be used and correctly documented.
- 12.2 Both the vehicle’s main tank and if applicable the auxiliary tank, must be fueled to 40% of fuel tank capacity.
- 12.3 For the vehicle prep, the fuel temperature for gasoline fueled vehicles must be within the 45-70 °F range.
- 12.4 For the FTP, the temperature of the dispensed fuel (gasoline and methanol) must be between 45-60 °F prior to fueling the test vehicle.
- 12.5 The fuel cap(s) must be installed within 1 minute of fueling.
- 12.6 The vehicle must be refueled within 1 hour of completion of the preconditioning drive.

13. Quality Provisions:

- 13.1 The technician is responsible for:
 - 13.1.1 Fueling and draining the vehicle's fuel tank(s) in accordance with this procedure.
 - 13.1.2 Completing a new form NVFEL 702-01 "Vehicle Fuel Exchange" for each fuel exchange.
 - 13.1.3 Recording data on form NVFEL 702-01 "Vehicle Fuel Exchange" as appropriate for the process.
 - 13.1.4 Signing and dating the NVFEL 702-01 "Vehicle Fuel Exchange" upon completion of fuel exchange process.
- 13.2 If a vehicle is incorrectly fueled, the Compliance/ Development Testing Group Leader shall be consulted for corrective action.
- 13.3 The validating person's and operator's identification numbers must appear on all forms and test records, certifying that the data is correct and complete.
- 13.4 Deviations from this procedure shall be documented on NVFEL Form 902-01 "Test Status Report". In general, these deviations will void the test. However, the customer may choose to accept the test as variant. To do this, the customer shall indicate acceptance by signing and dating NVFEL Form 902-01 "Test Status Report".

Attachment A
Vehicle Fuel Exchange Ticket
Form NVFEL 702-01

Vehicle Fuel Exchange																
Fueling: <input type="checkbox"/> 1st <input type="checkbox"/> 2nd <input type="checkbox"/> 3rd <input type="checkbox"/> Test																
Test Number: _____																
Vehicle ID#: _____																
Start-of-Drain Time: _____																
End-of-Drain Time: _____																
Dispenser Fuel Temperature: _____ °F																
End-of-Fueling Time: _____																
Cap on Time: _____																
Operator ID: _____ Date: _____																
To Print Auxiliary Tank fill, pull fuel ticket up to this line																
Verified by: _____ Date: _____																
Comments: _____																
Fuel Code & No.	Gallon Reading	10 ths														
AA _____ Phase II BB _____ Unleaded Test DD _____ Unleaded Prep																
<table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black; width: 50%;">Fuel Type</th> <th style="text-align: left; border-bottom: 1px solid black; width: 50%;">Fuel Container Code</th> </tr> </thead> <tbody> <tr> <td>_____ Certification Fuel</td> <td>_____ 21</td> </tr> <tr> <td>_____ Phase II Fuel</td> <td>_____ 22</td> </tr> <tr> <td>_____ Certification Diesel Fuel</td> <td>_____ 23</td> </tr> <tr> <td>_____ Low Sulfur Diesel Fuel</td> <td>_____ 24N _____ 24C _____ 24S</td> </tr> <tr> <td>_____ No Sulfur Diesel Fuel</td> <td>_____ 25N _____ 25C _____ 25S</td> </tr> <tr> <td>_____ Other _____</td> <td>_____ 26N _____ 26C _____ 26S</td> </tr> </tbody> </table>			Fuel Type	Fuel Container Code	_____ Certification Fuel	_____ 21	_____ Phase II Fuel	_____ 22	_____ Certification Diesel Fuel	_____ 23	_____ Low Sulfur Diesel Fuel	_____ 24N _____ 24C _____ 24S	_____ No Sulfur Diesel Fuel	_____ 25N _____ 25C _____ 25S	_____ Other _____	_____ 26N _____ 26C _____ 26S
Fuel Type	Fuel Container Code															
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_____ No Sulfur Diesel Fuel	_____ 25N _____ 25C _____ 25S															
_____ Other _____	_____ 26N _____ 26C _____ 26S															
Form 702-01: 07-31-2003																

Attachment B
Fuel Spill Clean Up Instruction

Fuel spilled on the floor must be sprayed with an AFFF foam extinguisher.

Do not spray the vehicle with the AFFF foam extinguisher.”

The spill then must be covered with absorbent mats (available near the fueling area).

The absorbent mats must be gathered from the floor and discarded in the flammable mat waste containers located in the west soak area or in the yellow hazardous waste disposal bags located in the lockers at the south end of the large soak area.

Remove fuel spilled on a vehicle with a clean hydrocarbon-absorbing towel. Discard in the designated flammable waste container.

If the flammable waste container is full, notify the NVFEL Safety Officer to have it emptied.

If the situation is judged to be an emergency, activate the “Main Fuel Supply Emergency Air Shutoff” by pushing one of the fuel shutoff switches located near the fuel bay.

“Emergency Stop” buttons are also located on the center divider at the front and rear of the fuel bay.

Any “Emergency Stop” button will stop the flow of fuel by shutting down the complete fuel bay system, not just the pump being used. Therefore, these buttons should only be used in an emergency situation.

After any emergency stop button is used, the fuel system will have to be restarted. If you are not familiar with the fuel system, contact the Compliance/ Development Testing Leader

In an emergency, the methanol fuel system may be shut off by turning the “Methanol Emergency Air Valve,” located on east bay rear wall at the left side of the methanol fuel dispensing rack, to the “Off” (perpendicular to the air line) position.


A fuel spill may void the prep or test. For that reason, the Compliance/ Development Testing Leader should be informed of any spill that occurs.

Attachment C
Test Parameters / Data
Form NVFEL 700-01

Test Parameters / Data			
Vehicle ID #		Test Number	
Test Purpose:		Config. No:	
MFG Code / Name:			
Cert Rep:		Phone Number:	
If problems arise and the Certification Representative is not available, page Fred Hart at 734-473-2230			
Test Request Comment:			
Test Procedure:			
Canister Loading:		Canister Capacity:	
Drive Axle Tire Size:			
Fuel Type:			
40 % Volume:	Main Tank:		
Drive Axle:	Front Wheel Drive		
Fan Placement:			
Additional Fan Placement:			
Set Tire Pressure to:	45 psi		
Equivalent Test Weight:		Target Coastdown Time:	
Actual HP:		Shift Schedule:	
Start 6-hr soak. Record "Key Off" date/time		Date	Time Initial(1)
Add 6 hours to the "key off" time recorded above.			+6:00
Do not start the vehicle before		Date	Time(2)
<u>Drive vehicle to dyno for preconditioning</u>			
End 6-hr soak. Record "key on" date/time		Date	Time Initial(3)
Drain Fuel and Fill to 40% - within 1-hr of Prep			
Fuel cap on. Record "Start of soak " date/time		Date	Time Initial(4)
Add 12 hours to the time recorded above.			+12:00
Do not start the vehicle before		Date	Time(5)
Odometer Reading at end of Preconditioning (Phase):			Kilometers Miles
Comments			

Attachment D

EPA Testing Service Test Request Report / Vehicle Information

	EPA Testing Service Test Request Report	Vehicle Information	EPA Request Number: 20020064
			TSD Entry Station: Vehicle Test
			Use Entry Date: 01/03/2002
			Only Entry Time: 01:05 PM

ALL VEHICLES	MFR _____	VID _____	Config. No. _____	Model Year _____
Model Code _____	Vehicle Type _____	Drive Code _____		
Engine Type _____	Engine Code _____	Default Fuel Type _____		
Transmission Config. _____	Transmission Mode _____	Equiv. Test Wt. _____ lb	Actual Dyno HP _____	
Electric Coeff. (Set) A _____ B _____ C _____	EPA A _____ B _____ C _____	(Target) A _____ B _____ C _____		
Number of Canisters _____	Canister Working Capacity _____ gm	Total Canister Vol. _____ liter	Vehicle Vol. _____ liter	
Nominal Main Tank Capacity 17.1 gallon, 40% <u>6.84</u> gallon	Nominal Aux Tank Capacity _____ gallon, 40% _____ gallon			
AC _____ Fuel Injection _____ Turbo <u>N</u> Fan _____	Shift Ind Light _____	Database Code _____		
SourceCode _____	VIN _____	Engine Family _____	Evap Family _____	
Vehicle Odometer Unit (M=mile, K=kilometer) _____	Tire & Rim Sizes _____	Tire PSI Front _____	Rear _____	

CERTIFICATION VEHICLES
Active Year _____ Axle Ratio _____ Curb Wt. _____ lb Drive Axle Wt Full Tank _____ lb, Empty Tank _____ lb
Idle RPM _____ Ignation Timing _____ degree Target Coast Down _____ sec Timing RPM _____

IN-USE VEHICLES	Date Banked _____	Vehicle No. _____	Model Name _____
Owner Name _____	Work Phone _____	Home Phone _____	

Test Requests

ALL TEST REQUESTS	Requester _____	Phone _____	Avail. Prep Date _____
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Evap _____	Particulate _____	Canister _____	Shift Sch ID			
Test Purpose	Test Procedure	Req. Fuel Type	Test	Prep	No. Preps	
1		06 Unleaded (at	FTA	FTA	1	
2		06 Unleaded (at	FTA	FTA	1	
3		06 Unleaded (at	FTA			
4						
5						
6						
7						
8						
9						
10						

CERT TEST REQUESTS	MFR Rep Initial _____	Test Scheduler Signature								
LATEST MFR TEST RESULTS	Reason for Confirmation _____									
Test No.	Test Date	Test Proc	HC	HCNM	NOx	CO	CO2	FE	QCT	Test Date

EPA NVFEL TSD TEST REQUEST REPORT 1/20/2000